

*Indian Standard***PLASTICS BOTTLES FOR POTABLE WATER —
SPECIFICATION***(Second Revision)***1 SCOPE**

1.1 This standard prescribes the requirements for plastic bottles used for carrying/storing drinking water

1.2 This standard does not include plastics insulated bottles

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below

<i>IS No</i>	<i>Title</i>
2798 1998	Methods of test for plastics containers (<i>first revision</i>)
4905 1968	Methods for random sampling
7019 1982	Glossary of terms in plastics and flexible packaging excluding paper (<i>second revision</i>)
7408 (Part 1) 2000	Blow moulded polyolefin containers. Part 1 Up to 5 litres capacity (<i>first revision</i>)
7511 (Part 4) 1986	Dimensions for neck finishes. Part 4 Roll on sealed threads, pillar proof (<i>first revision</i>)
9833 1981	List of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water
9845 1986	Methods of analysis for the determination of specific and/or overall migration of constituents of plastic materials and articles intended to come in contact with

*IS No**Title*

foodstuffs, pharmaceuticals and drinking water (*first revision*)

10146 1982

Specification for polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

10151 1982

Specification for polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

10910 1984

Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

12252 1987

Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

14534 1998

Guidelines for recycling of plastics

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7408 (Part 1) and IS 7019 shall apply

4 REQUIREMENTS**4.1 Material**

4.1.1 All components of water bottle (including the bottle itself, the cap and the drinking cup) which come in contact with water shall be manufactured from HDPE, PVC, PP and PET conforming to the following Indian Standards respectively

- IS 10146
- IS 10151,
- IS 10910, and
- IS 12252

4.1.2 The bottle shall be coloured, pigmented and opaque. The colourants and pigments used shall conform to the limits and tolerances prescribed in IS 9833.

4.1.3 The hanging cord or straps, if provided, shall be of a flexible material which is not affected by water.

4.2 Capacity

4.2.1 The bottles shall be manufactured in nominal capacity of 500 ml, 750 ml, 1 000 ml and 1 500 ml or any other capacity as agreed to between the purchaser and the supplier.

4.2.2 The brimful capacity shall exceed the nominal capacity by a minimum of 5 percent. The brimful capacity shall be determined by the method prescribed in IS 2798.

4.3 Design

The bottle design shall be such that it is stable when kept in vertical position. The shape of the bottle shall be as agreed to between the purchaser and the supplier.

4.4 Neck Size

The neck shall be of nominal size 25 mm, 28 mm, 31.5 mm or 46 mm, pillar proof finish [see IS 7511 (Part 4)].

4.5 Cap

The bottle shall be closed with a suitable closure made of metal or plastics and pillar proof in character. Additional protection shall be made by using printed shrink sleeves or similar measures.

4.6 Cup

The bottle may be provided with a drinking cup, which shall fit on to the bottle neck.

4.7 Hanging Cord or Strap

A flexible hanging cord or strap to hang the bottle on shoulder or peg may be provided with the bottle. It may be hinged or strapped to the body of the bottle.

4.8 Workmanship and Finish

The bottle shall be manufactured in accordance with good manufacturing practices. These shall be free from manufacturing defects such as foreign particles, burnt, oxidized or unhomogenized matter, flash, rocking bottom, sharp edges, etc.

4.9 Odour

The bottles shall be free from any odour, dirt or dust particles.

4.10 Mass

The mass of the bottles shall be as agreed to between the purchaser and the supplier. There shall be a tolerance of ± 5 percent on the agreed mass.

4.11 Dimensions

The height and diameter of the bottle shall be as agreed to between the purchaser and the supplier. The tolerance on agreed dimensions shall be as follows:

a) Up to and including 100 mm	± 1.5 mm
b) Over 100 mm and up to 200 mm	± 2.0 mm
c) Over 200 mm	± 2.5 mm

4.12 Overall Migration

The limit of overall migration with water when tested as prescribed in IS 9845 shall not exceed 60 mg/l of simulant and 10 mg/dm² of the surface of the container.

4.13 Tests

4.13.1 Closure Leakage Test

The bottle shall be filled to its nominal capacity with coloured water at ambient temperature and closed tightly with the cap. The stopper plug, where provided, shall be pressed tight in position and the cap shall be fitted tight by hand. The filled bottle shall be kept in vertically inverted position over a piece of blotting paper for a period of 30 min. At the end of the test, the closure shall not show any leakage of water.

4.13.2 Drop Impact Test

The bottle with the cap but without the drinking cup, when subjected to the drop test as prescribed in IS 2798 shall not show any sign of cracking. Slight deshaping of the body shall not render the bottles unacceptable in the test.

4.13.3 Hanging Cord/Strap Strength Test

The hanging cord/strap shall be able to support the mass equal to 3 times the mass of filled bottle for 10 min without breaking. The elongation under load shall not exceed 10 percent of the total length of the cord. Initial stretching due to unwinding of the cord shall not be taken as elongation for the purpose of calculation.

5 WATER POTABILITY TEST

Potable water stored in the bottle for 72 h shall not acquire any unpleasant odour or bitter taste or shall not impair the health when tested according to the method prescribed in Annex A.

6 ADDITIONAL REQUIREMENTS FOR ECO-MARK

6.1 General Requirements

6.1.1 The product shall conform to the requirements for quality, safety and performance prescribed

6.1.2 The manufacturer shall produce to BIS the consent clearance as per the provisions of *Water (Prevention & Control of Pollution) Act, 1974* and *Air (Prevention & Control of Pollution) Act, 1981* along with the authorization if required under *Environment (Protection) Act, 1986* and the Rules made thereunder while applying for the ECO-Mark. The manufacturer shall produce documentary evidence with respect to the compliance of regulation under *Prevention of Food Adulteration Act, 1954* and *Drugs and Cosmetic Act, 1940* and the Rules made thereunder, wherever necessary

6.1.3 The product must display a list of critical ingredients in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards

6.1.4 The product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'

6.1.5 The material used for product packaging shall be recyclable or biodegradable

6.1.6 It shall also suitably mention that ECO Mark label is applicable only to the packaging material/package if content is not separately covered under ECO Mark. It may be stated that ECO-Mark is applicable to the product or packaging material or both

6.2 Product Specific Requirements

For the manufacture of this product one or more of the virgin material covered in following Indian Standards shall be used

IS No	Title
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS No

Title

10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (LAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon 6 polymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252 : 1987	Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

7 MARKING

7.1 Each bottle shall be marked or labelled with the following information

- Name and/or trade mark of the manufacturer
- Nominal capacity in ml and
- Recycling symbol in line with IS 14534

7.2 BIS Certification Marking

Each bottle may also be marked with the Standard Mark

7.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards

8 SAMPLING

The samples of the bottles shall be drawn and the criteria for conformity determined as prescribed in Annex B

ANNEX A

(Clause 5)

METHOD OF TEST FOR POTABILITY OF WATER STORED IN PLASTICS BOTTLES

A-1 GENERAL

A-1.1 Odour of water, though very important, cannot be determined in absolute units. Olfactory sense, which is most sensitive means of detecting small concentration of odiferous substances, lacks precision and mathematical expression nevertheless a quantitative test is prescribed.

A-1.2 The water for testing shall be clear and fresh free from any suspended or dissolved impurities. If necessary it may be filtered before storage.

A-2 PROCEDURE

Heat the water to a temperature of $38 \pm 2^\circ\text{C}$ and fill the bottles to its nominal capacity and close tightly with the cap. Keep the bottles at $38 \pm 2^\circ\text{C}$ for a period of 72 h at ambient temperature.

A-3 OBSERVATIONS

At the end of 72 h the water shall not give any unpleasant odour or taste. Any visible fungus growth in water shall render the bottle material unfit for use.

ANNEX B

(Clause 8)

SAMPLING OF PLASTICS POTABLE WATER BOTTLE

B-1 SCALE OF SAMPLING

B-1.1 Lot

In any consignment all the bottles of the same material and drawn from a single batch of manufacture shall be grouped together to constitute a lot.

B-1.2 Scale of Sampling

For ascertaining the conformity of the lot to the requirements of this standard, tests shall be carried out for each lot separately. The number of bottles to be sampled from a lot shall be in accordance with Table 1.

B-1.3 The bottles shall be selected at random from the lot. To ensure the randomness of selection methods given in IS 4905 may be followed.

B-2 CRITERIA FOR CONFORMITY

B-2.1 Visual Examination

The sample bottles selected as per col 2 of Table 1 shall be examined for workmanship and finish (see 4.8) and odour (see 4.9). Any bottle failing in one or more of the requirements shall be termed as defective. The lot shall be accepted under this head, if the number of defective bottles in sample does not exceed the acceptance number given in col 3 of Table 1.

B-2.2 Brimful Capacity and Bottles Mass

For the purpose of above tests, five bottles for lot size up to 5 000 and 10 bottles for lot size above 5 000 shall be selected at random from the samples already drawn according to B-1.3. Each of the sample bottles shall be subjected to tests for brimful capacity (see 4.2.2) and bottle mass (see 4.10). There shall be no failure if the lot is to be accepted under this clause.

B-2.3 Test for Closure Leakage and Hanging Cord Strap Strength

The sample bottles drawn according to col 4 of Table 1 shall be tested for closure leakage test (see 4.13.1) and hanging cord/strap strength (see 4.13.3). Any bottle showing leakage, crack or permanent buckling when subjected to tests shall be taken as defective. The number of defectives shall not exceed the acceptance number given in col 5 of Table 1, for the lot to be accepted as conforming to specifications.

B-2.4 Drop Impact Test

B-2.4.1 For lot size up to 3 000, the sampling shall be as follows:

Take a total sample of sixteen bottles at random from a lot. Divide this sample into two sets of eight each, designated as Set 1 and Set 2. Leakage of water

through cracks and closures after the test shall be considered as a defect. However, slight denting shall not be taken as failure of the bottle in the test.

B-2.4.1.1 Each bottle of Set 1 shall be subjected to the drop impact test. If none of the bottles fail in the test, the lot shall be accepted. If only one bottle is found defective, the test shall be repeated on the second set of bottles (*see B-2.4.1*) otherwise the lot shall be rejected.

B-2.4.1.2 If, in the second set none of the bottles are found defective then the lot shall be accepted as conforming to specification.

B-2.4.2 For lot size greater than 3 000, the sampling criteria shall be as follows:

Take a total sample of size twenty-six bottles taken at random from a lot. Divide the sample into two sets of

thirteen each, designated as Set 1 and Set 2.

B-2.4.2.1 Each bottle of Set 1 shall be subjected to the drop impact test. If none of the bottles are found defective, the lot shall be accepted. If one or two bottles fail in the test, the test shall be repeated on the second set (*see B-2.4*). If the number of defectives is three or more, the lot shall be rejected.

B-2.4.2.2 If the total number of bottles found defective in the first and the second set combined is four or more, the lot shall be rejected, else accepted as conforming to specifications.

B-2.5 Dimensions and Overall Migration

The sub sample of size given in col 6 of Table 1 shall be subjected to tests for dimensions (*see 4.11*) and overall migration (*see 4.12*). No failures shall occur for acceptance of the lot under this clause.

Table 1 Scale of Sampling and Acceptance Number
(Clauses B-1.2, B-2.1, B-2.3 and B-2.5)

Lot Size	For Visual Examination (<i>See 4.8 and 4.9</i>)		For Tests (<i>See 4.3.1 and 4.3.3</i>)		No. of Samples for Dimensions and Overall Migration (<i>See 4.11 and 4.12</i>)
	Sample Size	Acceptance Number	Sample Size	Acceptance Number	
(1)	(2)	(3)	(4)	(5)	(6)
Up to 500	13	1	5	0	1
501 to 1 000	20	2	8	0	2
1 001 to 3 000	32	3	13	0	2
3 001 to 5 000	50	5	20	1	3
5 001 and above	80	7	32	2	5

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